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⑰ **Lawn sprinkler.**

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## Description

### Field of the Invention

This invention relates to lawn sprinklers according to the preamble of claim 1 and as disclosed in EP—A—0 010 925.

### Background to the Invention

EP—010925 discloses a sprinkler having a water dispersing member rotatably mounted about a vertical axis above an orifice so that an upwardly directed jet of water from the orifice impinges on the water dispersing member which rotates and provides a droplet spraying effect. The water dispersing member has a cone-like but curved profile (Figure 7) which is uniform around its periphery so that water is distributed from the water dispersing member around its complete periphery. In contrast to the present invention which aims to provide a sprinkler with a water dispersing member having a particular arrangement of concave and convex curved surfaces defining a local recess from which water is flung off as the water dispersing member rotates.

### Summary of the Invention

According to the invention there is provided a lawn sprinkler comprising a water dispersing member mounted for free rotation about a vertical axis, and a nozzle which is arranged to direct a water jet upwardly, in a direction parallel to said axis of rotation, the dispersing member having a first, convexly curved surface and a second, concavely curved surface, the reaction to the force of water impinging on the dispersing member being arranged to cause rotation of the dispersing member about said axis, so that the water flung off the dispersing member is distributed through 360° about said axis of rotation, characterised in that the convexly curved surface is substantially part-cylindrical, the corresponding notional cylinder having a substantially horizontal central axis, and the concavely curved surface is substantially part-cylindrical, the corresponding notional cylinder having a substantially horizontal central axis orthogonal to the first-mentioned central axis, and in that the convexly curved surface and the concavely curved surface are adjacent on the water dispersing member and adjoin along a line of transition between the two curved surfaces, the convexly curved surface and the concavely curved surface forming the walls of a recess in the water dispersing member, in use water issuing from the nozzle impinging on the convexly curved surface which distributes the water onto the concavely curved surface from an edge of which the water is dispersed through a substantial range of angles of elevation as the dispersing member rotates. A lawn sprinkler forming a preferred embodiment of the invention will now be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a plan view of the lawn sprinkler,

Figure 2 is a side view of the sprinkler, looking in the direction of arrow A in Figure 1,

Figure 3 is an end view of the sprinkler, looking in the direction of arrow B in Figure 1, and

Figure 4 is a fragmentary exploded view of parts of the sprinkler, shown in section on the line IV—IV in Figure 1.

### Detailed Description of the Drawings

The lawn sprinkler has a base 10 which is generally Y-shaped in plan, as viewed in Figure 1. To one limb 12 of the base 10 is attached a hose connector 14, providing for attachment to a flexible hose (not shown). The two remaining limbs 16, 18 of the base 10 extend outwardly in a splayed manner to afford stability of the sprinkler which rests on the ground at four locations 20, 22, 24, 26 disposed on the undersides of the limbs 12, 16, 18. At the region where the limbs 12, 16, 18 meet, a water dispersing member 28 is mounted on the base 10 about a vertical pivot axis 30. Referring to Figure 4, it can be seen that the base 10 has a moulded body 32 having a water passage 34 which leads from the hose connector 14, through the core of the limb 12 to a circular aperture 36 centred on the axis 30. The aperture 36 leads to a circular recess 38 into which fits a boss-like projection 40 formed on the underside of a cover 42, visible also in Figures 1 to 3. The internal wall of the boss-like projection 40 has four equi-angularly disposed slots 44, and the slots receive four fins 45 formed on a spindle 46. The spindle extends upwardly, with all round radial clearance with respect to a circular aperture 50 in the cover 42, and the water dispersing member 28 is pivotally mounted on the projecting upper end of the spindle 46 which is retained in position and held against rotation by the location of the fins 45 in the slots 44.

The water dispersing member 28 has a convexly part-cylindrical surface 52 adjoining a concavely curved part-cylindrical surface 54. The position of the surface 52 is best shown in Figure 3, and the position of the surface 54 is best shown in Figure 2. The two surfaces 52 and 54 have radii lying in orthogonal planes and meet along a complexly curved line. It can be seen from Figure 1 that the water dispersing member 28 has a part-cylindrical outer wall and a recess bounded by the surfaces 52 and 54 and also has a projection 58 (best seen in Figure 1) overlying the upper region of the concave surface 54. The water dispersing member 28 is moulded from a plastics material so as to be hollow, the member 28 being covered by a separately moulded cap 60 secured (e.g. by sonic welding) on the top of the member 28.

The member 28 is moulded with a cylindrical bearing sleeve 62 (Figure 4) by which the member 28 is pivotally mounted on the spindle 46. A circlip or the like (not shown) locates in a groove 48 at the upper end of the spindle 46 to prevent the member 28 being lifted off the spindle which is fixed in the base 10 by virtue of the cover 42 being sonically welded to the moulded body 32.

In use, water supplied by the hose pipe passes through the hose connector 14 and water passage 34 to reach the chamber defined within the boss-like projection 40. From this chamber, the water

issues as a jet from the nozzle defined by the annular clearance gap between the aperture 50 and the spindle 46. The upwardly directed stream of water issuing from the nozzle impinges upon the convex surface 52, whence it is deflected onto the concave surface 54. The result is that the water streams off the outer edge of the concave surface, water droplets of comparatively low velocity leaving the lower part of the edge and the water droplets of higher velocity leaving the higher part of the edge.

Each of the curved surfaces 52 and 54 extends through an arc of approximately 90°, and water leaves the edge of the concave surface through a range of angles of elevation between vertically downwards (at the lower part of the edge) and horizontal (at the upper part of the edge).

The reaction to the force of the water impinging on the dispersing member 28 causes the member 28 to rotate about the spindle 46 in the direction of the arrow D in Figure 1. The result is that a substantially continuous circular area is sprayed, the non-sprayed area in the immediate vicinity of the sprinkler being very small, and in any event, very much smaller than in many conventional sprinklers.

The dispersing member 28 is shaped so as to be dynamically balanced and prevent vibration. To achieve this, the dispersing member 28 has a weighted or solid portion the position of which is indicated at 64 in Figure 1.

#### Claims

1. A lawn sprinkler comprising a water dispersing member (28) mounted for free rotation about a vertical axis (30), and a nozzle which is arranged to direct a water jet upwardly, in a direction parallel to said axis of rotation, the dispersing member having a first, convexly curved surface (52) and a second, concavely curved surface (54), the reaction to the force of water impinging on the dispersing member being arranged to cause rotation of the dispersing member about said axis, so that the water flung off the dispersing member is distributed through 360° about said axis of rotation, characterised in that the convexly curved surface (52) is substantially part-cylindrical, the corresponding notional cylinder having a substantially horizontal central axis, and the concavely curved surface (54) is substantially part-cylindrical, the corresponding notional cylinder having a substantially horizontal central axis orthogonal to the first-mentioned central axis, and in that the convexly curved surface (52) and the concavely curved surface (54) are adjacent on the water dispersing member (28) and adjoin along a line of transition between the two curved surfaces (52, 54), the convexly curved surface (52) and the concavely curved surface (54) forming the walls of a recess in the water dispersing member (28), in use water issuing from the nozzle impinging on the convexly curved surface (52) which distributes the water onto the concavely curved surface (54) from an edge of which the water is

dispersed through a substantial range of angles of elevation as the dispersing member rotates.

2. A lawn sprinkler according to claim 1, characterised in that each of the curved surfaces (52, 54) extends through an arc of substantially 90°.

3. A lawn sprinkler according to claim 1 or 2, characterised in that the water dispersing member (28) is pivotally mounted on a spindle (46) which extends upwardly through said nozzle, with an annular clearance between the spindle (46) and the nozzle for the passage of water.

4. A lawn sprinkler according to claim 3, characterised in that the spindle (46) extends through an aperture in the convexly curved surface (52).

5. A lawn sprinkler according to any of the preceding claims, characterised in that the water dispersing member (28) is hollow.

6. A lawn sprinkler according to any of the preceding claims, characterised in that the water dispersing member (28) is moulded from synthetic plastics material and carries a separately moulded cap (60) attached to the top of the water dispersing member (28).

7. A lawn sprinkler according to claim 6, characterised in that the water dispersing member (28) and cap (60) are dynamically balanced by means of a weighted or solid portion (64).

#### Patentansprüche

1. Ein Rasensprenger mit einem um eine vertikale Achse (30) frei drehbar befestigten, Wasser verteilenden Glied (28) und mit einer Düse, die so angeordnet ist, daß sie einen Wasserstrahl in einer zu der Drehachse parallelen Richtung nach oben richtet, wobei das verteilende Glied eine erste, konvex gewölbte Oberfläche (52) und eine zweite, konkav gewölbte Oberfläche (54) aufweist, wobei die Reaktion gegenüber der Kraft des auf das verteilende Glied auftreffenden Wassers so ausgerichtet ist, daß eine Drehung des verteilenden Gliedes um diese Achse bewirkt und das von dem verteilenden Glied abgeschleuderte Wasser über einen Winkel von 360° um die Drehachse verteilt wird, dadurch gekennzeichnet, daß die konvex gewölbte Oberfläche (52) im wesentlichen teilzylindrisch ist, wobei der entsprechende imaginäre Zylinder eine im wesentlichen horizontale zentrale Achse aufweist, und die konkav gewölbte Oberfläche (54) im wesentlichen teilzylindrisch ist, wobei der entsprechende imaginäre Zylinder eine im wesentlichen horizontal zu der erstgenannten zentralen Achse unter 90° verlaufende zentrale Achse aufweist, und daß die konvex gewölbte Oberfläche (52) und die konkav gewölbte Oberfläche (54) auf dem Wasser verteilenden Glied (28) benachbart sind und entlang einer Übergangslinie zwischen den beiden gebogenen Oberflächen (52, 54) aneinander angrenzen, die konvex gewölbte Oberfläche (52) und die konkav gewölbte Oberfläche (54) die Wände einer Aussparung in dem Wasser verteilenden Glied (28) bilden, im Betrieb das aus der Düse austretende Wasser auf die konvex gewölbte Oberfläche (52) auftrifft, die das Wasser auf die konkav

gewölbte Oberfläche (54) verteilt, wobei das Wasser von einer Kante dieser Oberfläche bei Drehung des verteilenden Gliedes über einen wesentlichen Höhenwinkelbereich verteilt wird.

2. Ein Rasensprenger gemäß Anspruch 1, dadurch gekennzeichnet, daß jede der gewölbten Flächen (52, 54) über einen Winkel von im wesentlichen 90° verläuft.

3. Ein Rasensprenger gemäß Anspruch 1 oder 2, dadurch gekennzeichnet, daß das Wasser verteilende Glied (28) auf einer Spindel (46), die durch die Düse nach oben verläuft, schwenkbar befestigt ist, mit einem ringförmigen Zwischenraum zwischen der Spindel (46) und der Düse zum Durchtritt von Wasser.

4. Ein Rasensprenger gemäß Anspruch 3, dadurch gekennzeichnet, daß die Spindel (46) durch eine Öffnung in der konvex gewölbten Oberfläche (52) durchtritt.

5. Ein Rasensprenger gemäß irgendeinem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß das Wasser verteilende Glied (28) hohl ist.

6. Ein Rasensprenger gemäß irgendeinem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß das Wasser verteilende Glied (28) aus einem Kunststoff geformt ist und eine an der Oberseite des Wasser verteilenden Gliedes (28) befestigte, getrennt geformte Kappe (60) trägt.

7. Ein Rasensprenger gemäß Anspruch 6, dadurch gekennzeichnet, daß das Wasser verteilende Glied (28) und die Kappe mit einem beschwerten oder massiven Abschnitt (64) dynamisch ausgewuchtet sind.

#### Revendications

1. Arroseur à gazon comprenant un organe (28) disperseur d'eau monté à rotation libre autour d'un axe vertical (30) ainsi qu'une buse destinée à diriger un jet d'eau vers le haut, dans une direction parallèle audit axe de rotation, l'organe disperseur comprenant une première surface (52) à courbure convexe et une seconde surface (54) à courbure concave, la réaction à la force de l'eau venant heurter l'organe disperseur étant conçue pour provoquer la rotation de cet organe disperseur autour dudit axe, de telle sorte que l'eau projetée par l'organe disperseur soit répartie sur 360° autour dudit axe de rotation, caractérisé par

le fait que la surface (52) à courbure convexe est pour l'essentiel partiellement cylindrique, le cylindre fictif correspondant présentant un axe médian sensiblement horizontal, et la surface (54) à courbure concave est pour l'essentiel partiellement cylindrique, le cylindre fictif correspondant présentant un axe médian sensiblement horizontal orthogonal à l'axe médian précité; et par le fait que la surface (52) à courbure convexe et la surface (54) à courbure concave sont adjacentes sur l'organe (28) disperseur d'eau et se rejoignent le long d'une ligne de transition entre les deux surfaces courbes (52, 54), la surface (52) à courbure convexe et la surface (54) à courbure concave formant les parois d'un évidement dans l'organe (28) disperseur d'eau et, en service, de l'eau sortant de la buse venant heurter la surface (52) à courbure convexe qui répartit cette eau sur la surface (54) à courbure concave, à partir d'une arête de laquelle l'eau est dispersée sur une plage substantielle d'angles d'élévation lorsque l'organe disperseur tourne.

2. Arroseur à gazon selon la revendication 1, caractérisé par le fait que chacune des surfaces courbes (52, 54) s'étend selon un arc mesurant sensiblement 90°.

3. Arroseur à gazon selon la revendication 1 ou 2, caractérisé par le fait que l'organe (28) disperseur d'eau est monté pivotant sur une broche (46) qui s'étend vers le haut à travers ladite buse, un interstice annulaire étant réservé entre la broche (46) et la buse pour le passage de l'eau.

4. Arroseur à gazon selon la revendication 3, caractérisé par le fait que la broche (46) s'étend à travers une ouverture pratiquée dans la surface (52) à courbure convexe.

5. Arroseur à gazon selon l'une quelconque des revendications précédentes, caractérisé par le fait que l'organe (28) disperseur d'eau est creux.

6. Arroseur à gazon selon l'une quelconque des revendications précédentes, caractérisé par le fait que l'organe (28) disperseur d'eau est venu de moulage en une matière plastique synthétique, et porte une coiffe (60) moulée séparément, fixée au sommet de l'organe (28) disperseur d'eau.

7. Arroseur à gazon selon la revendication 6, caractérisé par le fait que l'organe (28) disperseur d'eau et la coiffe (60) sont équilibrés dynamiquement au moyen d'une zone lestée ou solide.

55

60

65

4

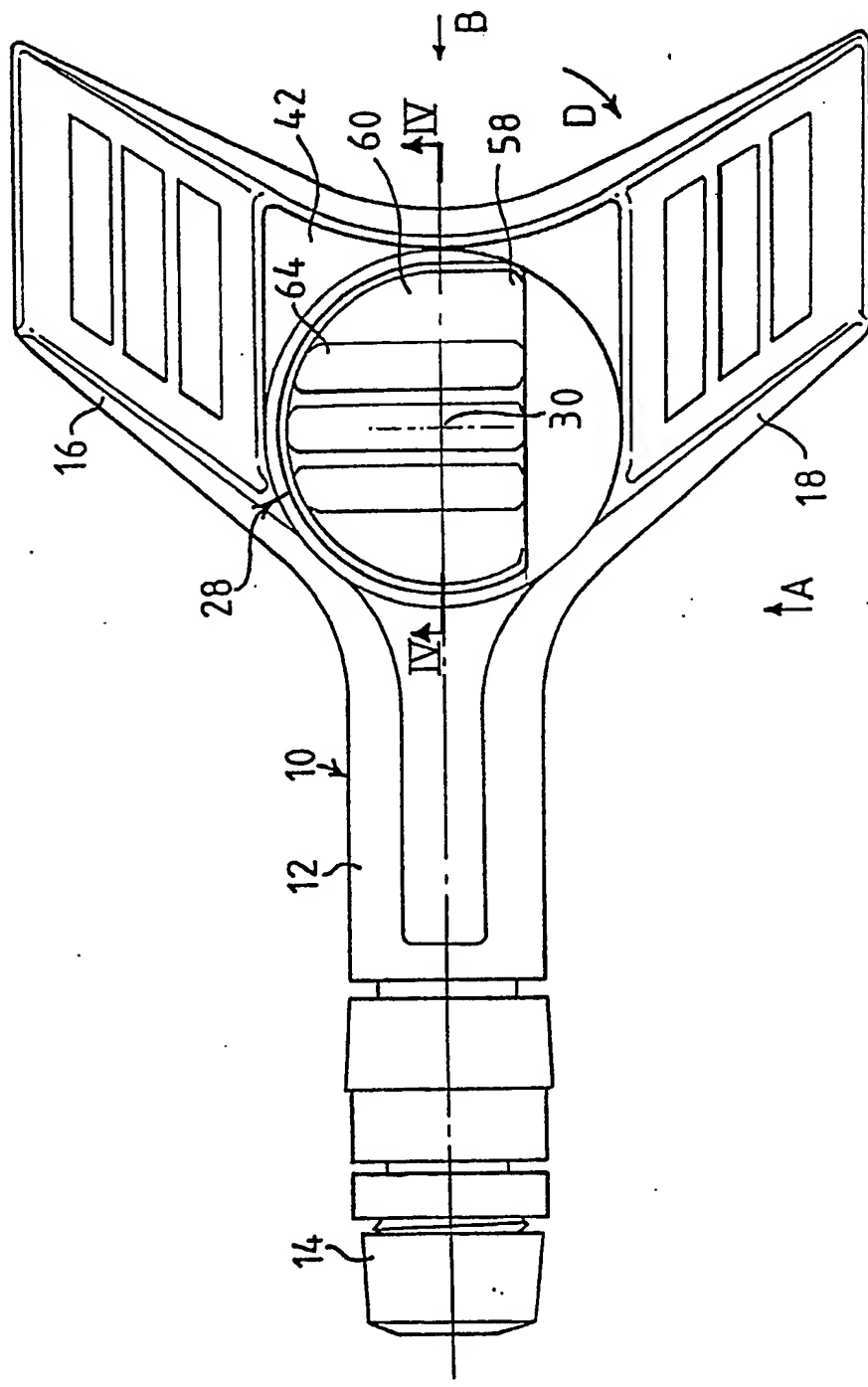


Fig.1

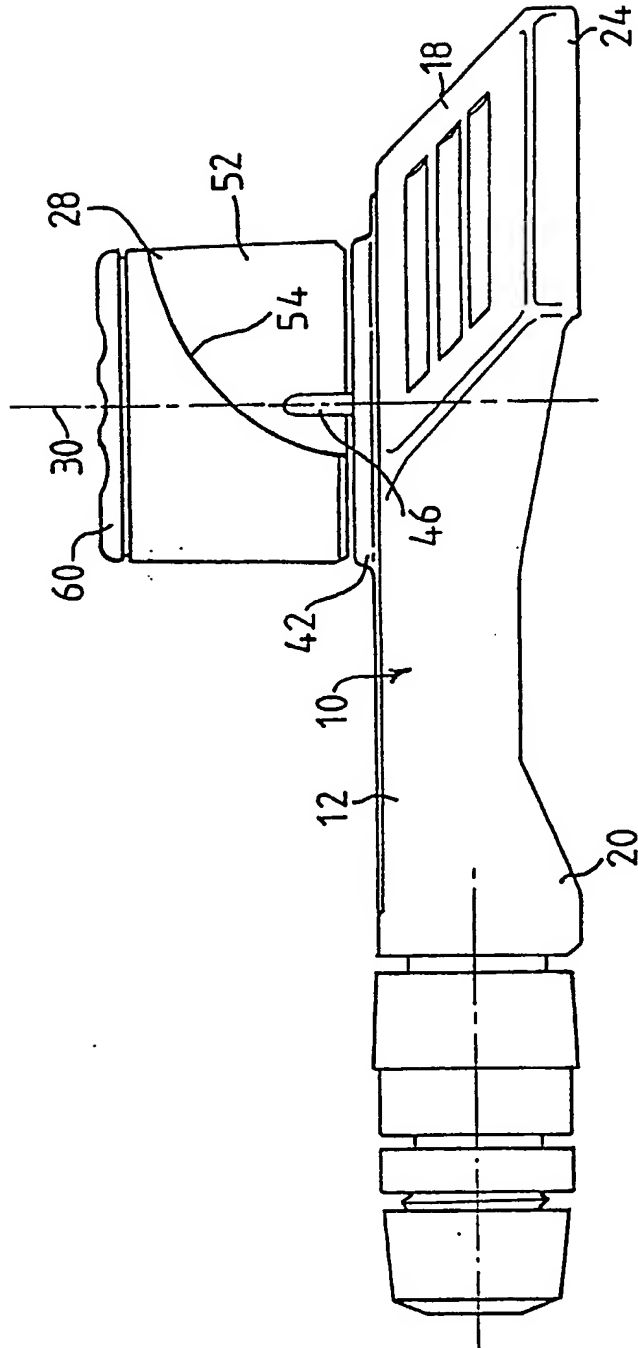


Fig. 2

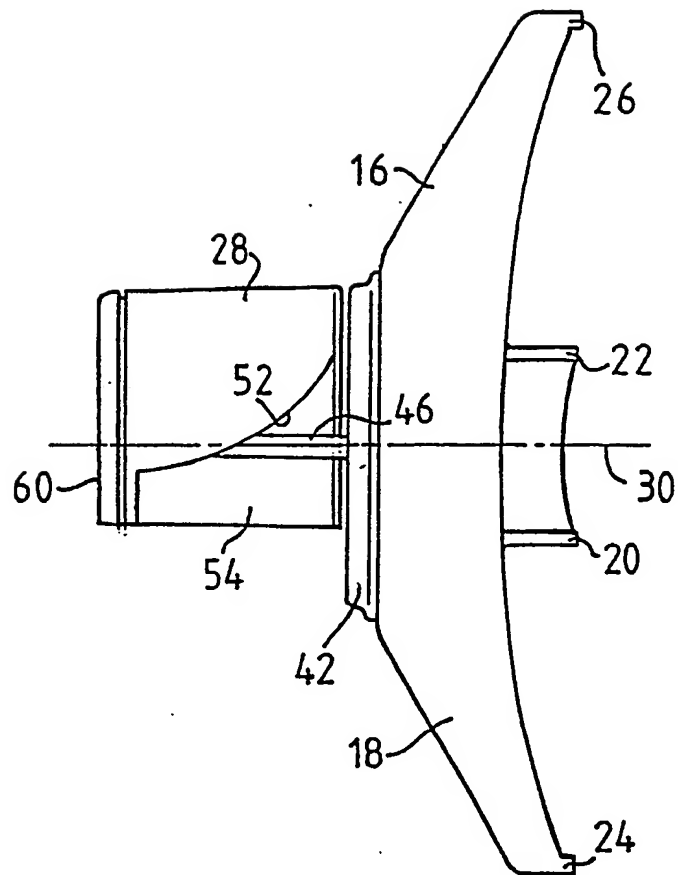


Fig. 3

